

33. A method according to claim 31 wherein said skin-related process is a non-malignant skin disorder.

34. A method according to claim 31 wherein said skin-related process is the development of benign tumors.

Q' cont'd
35. A method according to claim 33 wherein said non-malignant skin disorder is selected from aging, wrinkling, acne, keratinization, differentiation, proliferation disorders.

36. A method for *in vivo* modulation of malignant cell development in a subject, said method comprising administering to said subject an effective amount of 9-*cis*-retinoic acid.

37. A method according to claim 36, further comprising administering a potentiating, effective amount of interferon- α along with said 9-*cis*-retinoic acid.

38. A method according to claim 36 wherein said malignant cell development is selected from testicular cancer, lung cancer or acute promyelocytic leukemia.

39. A method according to claim 36 wherein said malignant cell development is skin cancer.

40. A method according to claim 36 comprising preventing the development of malignant epithelial tumors.

41. A method for *in vitro* modulation of cellular differentiation, said method comprising contacting said cells with an effective amount of 9-*cis*-retinoic acid.

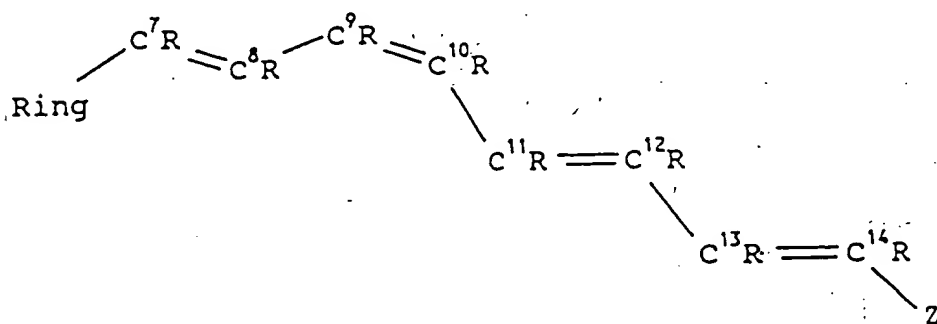
43. A method for in vitro modulation of cellular proliferation, said method comprising contacting said cells with an effective amount of 9-cis-retinoic acid.

44. A method according to claim 43 wherein said cells are melanoma cells.

45. A method for *in vitro* modulation of cellular retinol binding protein, said method comprising contacting said cells with an effective amount of 9-*cis*-retinoic acid.

46. A method for *in vitro* modulation of limb morphogenesis, said method comprising contacting said cells with an effective amount of 9-*cis*-retinoic acid.

47. Compounds according to the following formula:



Structure A

wherein:

unsaturation between carbon atoms C⁹ and C¹⁰ has a cis configuration, and one or both sites of unsaturation between carbon atoms C¹¹ through C¹⁴ optionally have a cis configuration;

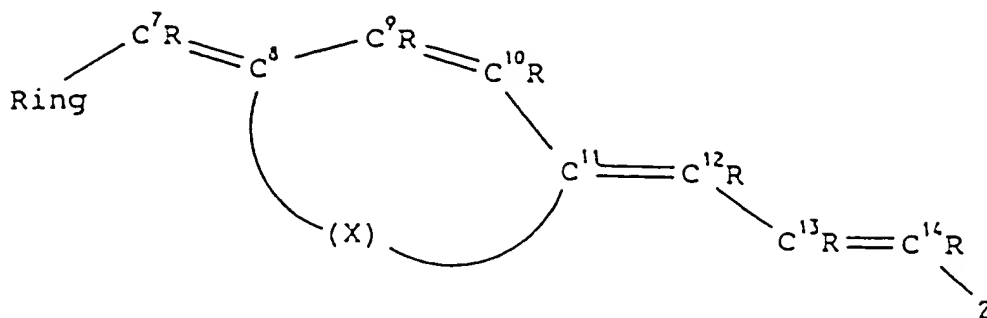
"Ring" is a cyclic moiety, optionally having one or more substituents thereon;

Q1 cont'd

Z is selected from carboxyl ($-\text{COOH}$), carboxaldehyde ($-\text{COH}$), hydroxyalkyl [$-(\text{CR}'_2)_n-\text{OH}$, wherein each R' is independently selected from hydrogen or a lower alkyl and n falls in the range of 1 up to about 4], thioalkyl [$-(\text{CR}'_2)_n-\text{SH}$, wherein R' and n are as defined above], hydroxyalkyl phosphate [$-(\text{CR}'_2)_n-\text{OP}(\text{OM})_3$, wherein R' and n are as defined above and M is hydrogen, lower alkyl, or a cationic species such as Na^+ , Li^+ , K^+ , and the like], alkyl ether of a hydroxyalkyl group [$-(\text{CR}'_2)_n-\text{OR}'$, wherein R' and n are as defined above], alkyl thioether of a thioalkyl group [$-(\text{CR}'_2)_n-\text{SR}'$, wherein R' and n are as defined above], esters of hydroxyalkyl groups [$-(\text{CR}'_2)_n-\text{O}-\text{CO}-\text{R}'$, wherein R' and n are as defined above], thioesters of hydroxyalkyl group [$-(\text{CR}'_2)_n-\text{O}-\text{CS}-\text{R}'$, wherein R' and n are as defined above], esters of thioalkyl groups [$-(\text{CR}'_2)_n-\text{S}-\text{CO}-\text{R}'$, wherein R' and n are as defined above], thioesters of thioalkyl groups [$-(\text{CR}'_2)_n-\text{S}-\text{CS}-\text{R}'$, wherein R' and n are as defined above], aminoalkyl [$-(\text{CR}'_2)_n-\text{NR}'_2$, wherein R' and n are as defined above], N-acyl aminoalkyl [$-(\text{CR}'_2)_n-\text{NR}'-\text{CO}-\text{R}''$, wherein R' and n are as defined above and R'' is a lower alkyl or benzyl], carbamate [$-(\text{CR}'_2)_n-\text{NR}'-\text{CO}-\text{OR}'$ or $-(\text{CR}'_2)_n-\text{O}-\text{CO}-\text{NR}'_2$, wherein R' and n are as defined above]; and

each R is independently selected from H , halogen, alkyl, aryl, hydroxy, thiol, alkoxy, thioalkoxy, amino, or any of the Z substituents, with the proviso that Structure A is not 9-*cis*-retinoic acid; or

any two or more of the R groups can be linked to one another to form one or more ring structures;

Structure I;

wherein:

"Ring", Z and R are as defined above;

X is $-(\text{CR}_2)_x-\text{X}'-(\text{CR}_2)_y-$,

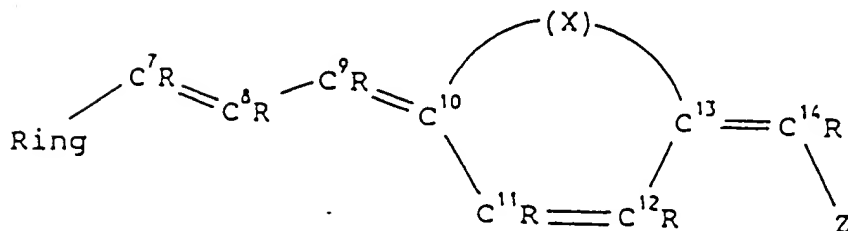
X' is selected from -O-, carbonyl, -S-, -S(O)-, -S(O)₂-, thiocarbonyl, -NR"-, or -CR₂-,

R" is hydrogen, alkyl, hydroxy, thiol, or alkoxy acyl;

x is 0, 1 or 2,

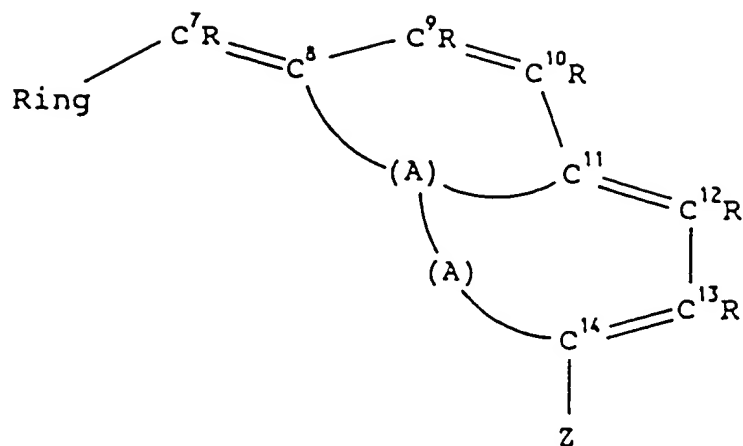
y is 0, 1, or 2, and

$x + y \leq 2$;

Structure II;

wherein:

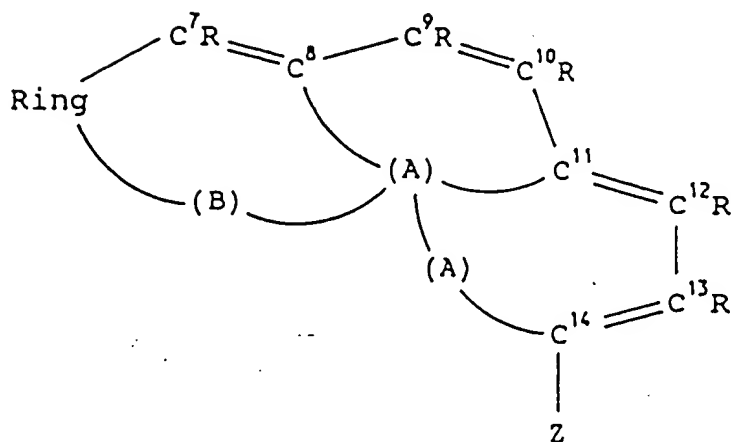
X, X', R, R", Z, Ring, x and y are as defined above;



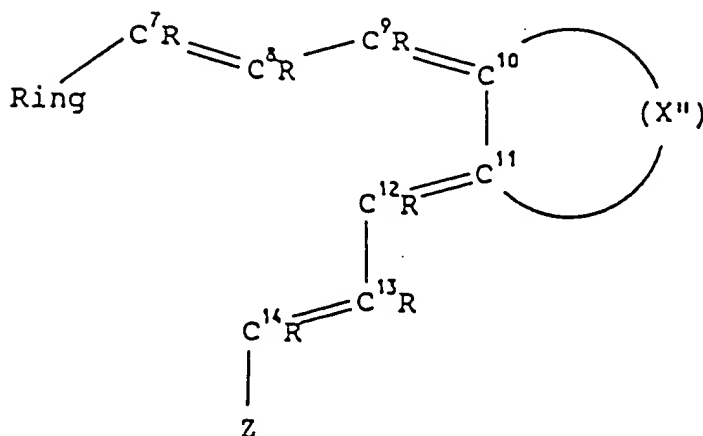
Structure III

wherein:

one A is X and the other A is X', and
 X, X', R, R'', Z, Ring, x and y are as defined above;

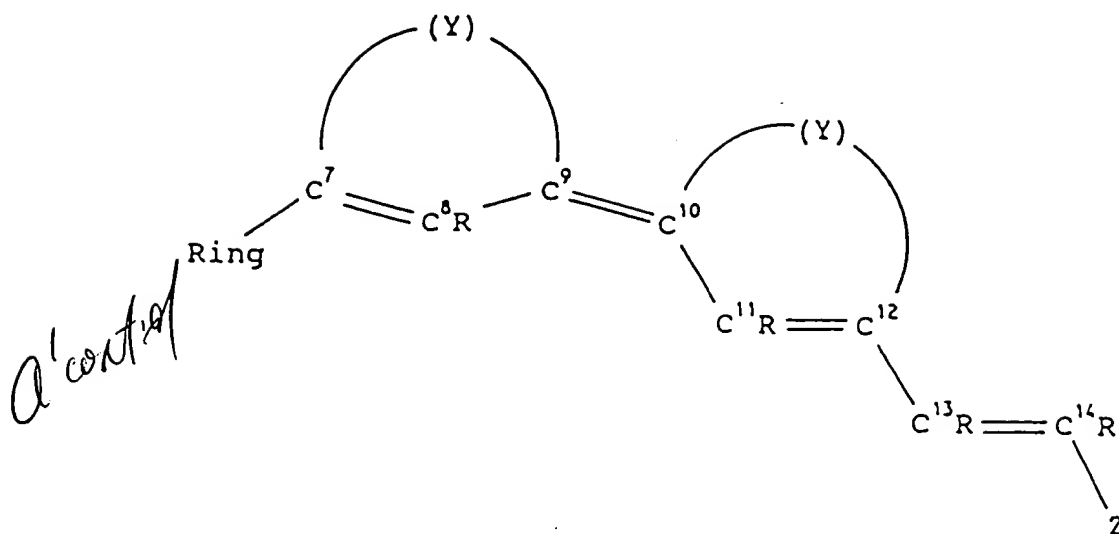


one A is X and the other A is X',
B is X', and
X, X', R, R'', Z, Ring, x and y are as defined above;



Structure V;

X'' is $-[(CR_2)_a - X' - (CR_2)_b] -$,
 X' , R , R'' , Ring and Z are as defined above,
 a is 0, 1, 2, 3 or 4,
 b is 0, 1, 2, 3, or 4, and
 $a + b$ is ≥ 2 , but ≤ 4 ;



Structure VI;

wherein:

Y is $-(\text{CR}_2)_c-\text{X}'-(\text{CR}_2)_d-$,
 X' , R, R'', Ring and Z are as defined above,
 c is 0, 1, 2 or 3,
 d is 0, 1, 2 or 3, and
 $c + d \geq 1$, but ≤ 3 ; and

